

Sock

The invention relates to a sock that is to be used particularly during sports activities and that is outfitted with padding in the treading area.

Human feet are generally accommodated in firm shoes, especially during sports activities. They are also frequently in socks. The many and rapid motions occurring during sports activities mean that the foot is subjected to great loads, which can bring about fatigue more rapidly. If there is an unequal distribution of the load in the treading area in particular, then this can lead to increased stress in the ligaments situated around the ankle joint. This can put exceptional strain on or even damage the ligaments, for example, if the individual's stride is incorrect or if he should hit the ground wrong. Any destabilizing of the ankle joint by wearing out the ligaments can also negatively impinge on the knee and the area around it. From this it is clear that the anatomical distribution of the load of the treading area of the foot is of the utmost importance to the stability of the entire locomotor system, and all the more so for sports activities.

The plane of the treading area of the foot between the heel and the outer and inner balls of the foot forms a three-point support system. This three-point support system makes it possible to balance the body's entire weight on a single leg. When walking, the foot's

natural longitudinal and transverse vault works like a suspension. The force of the load is absorbed, for the most part, by the three-point support system. Approximately 40% of the load is absorbed by the outer and inner balls of the foot, and 33% by the heel.

Approximately 15% of the load involves the outer instep of the foot, while the remaining load is absorbed by the toes (inner zone of the toes about 5%, outside zone about 7%).

To decrease the dynamic load of the foot and the premature fatigue associated with it, some form of dampening has been commonly used (compare DE 87 01 834 U1), for example, by padding the toe, sole and heel areas of the stock with something soft. The treading area of the sole that lies between the heel and the toes can also be outfitted with appropriate contours (compare EP 0 849 998 B1). These well known types of sock do not, however, take into account the specific load profile of the treading area of the foot.

This is what the invention remedies. The invention addresses the problem of creating a sock, especially for sports activities, that will be very comfortable to wear, while simultaneously taking into account the specific load profile of the treading area of the foot. The invention solves this problem by placing padding in the areas of the outer and inner balls, in the area of the heel as well as in the outer instep of the foot and, also, by means of intermediate spaces between the padding.

The invention creates a sock that is especially suited for sports activities and that takes into account the specific load profile of the foot. The separate pads in the various load areas mean that the foot is effectively supported and simultaneously protected against strain. Additionally, the suspension effect of the longitudinal and transverse vaults is amplified during walking, which, in turn, helps remove any further load from the ankle joint and the ligaments. The sectional padding reduces the weight of the sock, as compared with socks that are completely padded throughout the entire treading area. This represents a significant advantage, for example, in such extreme types of sports activities as triathlons or marathons. The intermediate spaces between the padding also increase air circulation.

As a further development of the invention, the weave of the fabric of the padding for the inner and outer balls of the foot is different. This makes a precise adaptation of this area of padding to the load distribution between the outer and inner balls of the foot possible, which, in turn, further improves the protective and support functions.

The invention is outfitted with sickle-shaped padding in the area of the toes. This sustains the absorption of the not inconsiderable share of the load by the toes.

The toe padding is advantageously executed in the form of individual pads, the fabric of which preferably has a different weave structure. This takes into consideration the heterogeneous load distribution in the area of the toes, and makes a specific absorption of the load in this area possible.

Another development of the invention is that the sock is equipped with at least one lateral climate conduit that leads into at least one of the intermediate spaces created by the separate pads. This benefits the continuous removal of perspiration from the bottom of the foot.

Other developments of the invention include the remaining sub-claims listed below. Examples of the invention are illustrated in drawings, which are individually described in the following and which show:

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| Figure 1 | Side view of the sock; |
| Figure 2 | View of the sock from below and |
| Figure 3 | View of the sock from below but outfitted differently. |

The illustrated example (Figure 1) shows a sock with a shaft A and a foot section B. In the treading area 1 of the foot, the sock is padded in sections 2, 3, 4 and 5. Pads 2, 3, 4 and 5 are not connected to each other, which emphasizes the padding in the intermediate spaces 6. Pads 2, 3, 4 and 5 have an anatomical shape, which means that they are optimally adapted to the load profile of the foot.

There is, in the area of the heel, a circular heel pad 2 that resembles the area of the point of the tread. There is an oval pad 3 in the outer instep the long side of which borders the outer region, on one side, and the longitudinal and transverse vaults of the foot on the other. A foot ball pad 4 is situated on the ball of the foot. Pad 4 also has a primarily oval shape and stretches from the outer to the inner ball of the foot. Foot section 1 in the area of the toes is outfitted with a sickle-shaped toe pad 5. The shape of the pad is determined by the varying lengths as well as the arrangement of the toes.

In the illustrated example as seen in Figure 3, the sock is outfitted with a pad 4 for the ball of the foot that is made up of two sections and is situated in the treading area of the foot 1. Pad 41 that points towards the interior of the foot has a higher density than the bordering partial pad 42. In contrast to the illustrated example as per Figure 1, the sickle-shaped toe pad 5 is made up of five individual pads 51 through 55, with a pad allocated to each toe. The fabric structure of pads 51 through 55 is different. The density of pads 51 through 55 decreases in the illustrated example. Pad 51 is the densest and pad 55 the least dense.

Pads 2 through 5 can have different thicknesses and densities, and can be made from only one material or from unlike materials. The varying thicknesses of pads 2 through 5 can be achieved by using thicker yarns or more threads. It is also possible to manufacture pads 2 through 5 in varying degrees of firmness. For example, those pads intended to absorb less load, such as is the case with toe pad 5, can be made softer than those pads that will be subject to higher loads, as is the case with the pad for the ball of the foot 4. As in the illustrated example of Figure 3, pads 41 and 42 as well as pads 51 through 55 can, of course, have diverse degrees of firmness as well depending upon the load that they must absorb.

The padding supports the fat pads that are naturally on the foot. A "barefoot climate" is achieved for the foot because the load profile of the foot has been taken into account in the shaping and positioning of the comfort pads. This "barefoot climate" is additionally

caused by the air circulation that is produced by the intermediate spaces 6 between pads 2 through 5. The climate conduit 7 that runs along the side of the sock and that leads into the intermediate spaces 6 also makes it possible to improve the elimination of moisture from the bottom of the foot.

Though socks have been the topic of description and discussion, the invention is not limited to these alone, but also includes stockings, tights and similar articles of clothing to which the invention also applies.

Patent Claims

1. Sock, in particular for the use with sports activities, that is padded in the treading area and is characterized by padding (2, 3, 4) in the inner and outer areas of the balls of the foot, in the area of the heel as well as in the outer instep and that has intermediate spaces (6) between pads (2, 3, 4).
2. Sock as per Claim 1, that is characterized by having a pad on the ball of the foot (4) in the area of the inner and outer ball, the fabric of which is dissimilar in structure.
3. Sock as per Claim 2, that is characterized by having a pad (4) on the ball of the foot that is made up of multiple sections.
4. Sock as per Claims 1 through 3 that is characterized by a sickle-shaped toe pad (5) arranged in the area of the toes.
5. Sock as per Claim 4 that is characterized by toe pads (5) that are made up of multiple individual pads (51 through 55).

6. Sock as per Claim 5 that is characterized by individual pads (51 through 55), the fabric of which is dissimilar in structure.
7. Sock as per Claims 1 through 6 that is characterized by pads (2, 3, 4, 5) that have varying degrees of firmness.
8. Sock as per Claims 1 through 7 that is characterized by having at least one side climate conduit (7) that leads into at least one of the separate pads (2 through 5) created by the intermediate spaces (6) on the treading area (1).

Figure 1

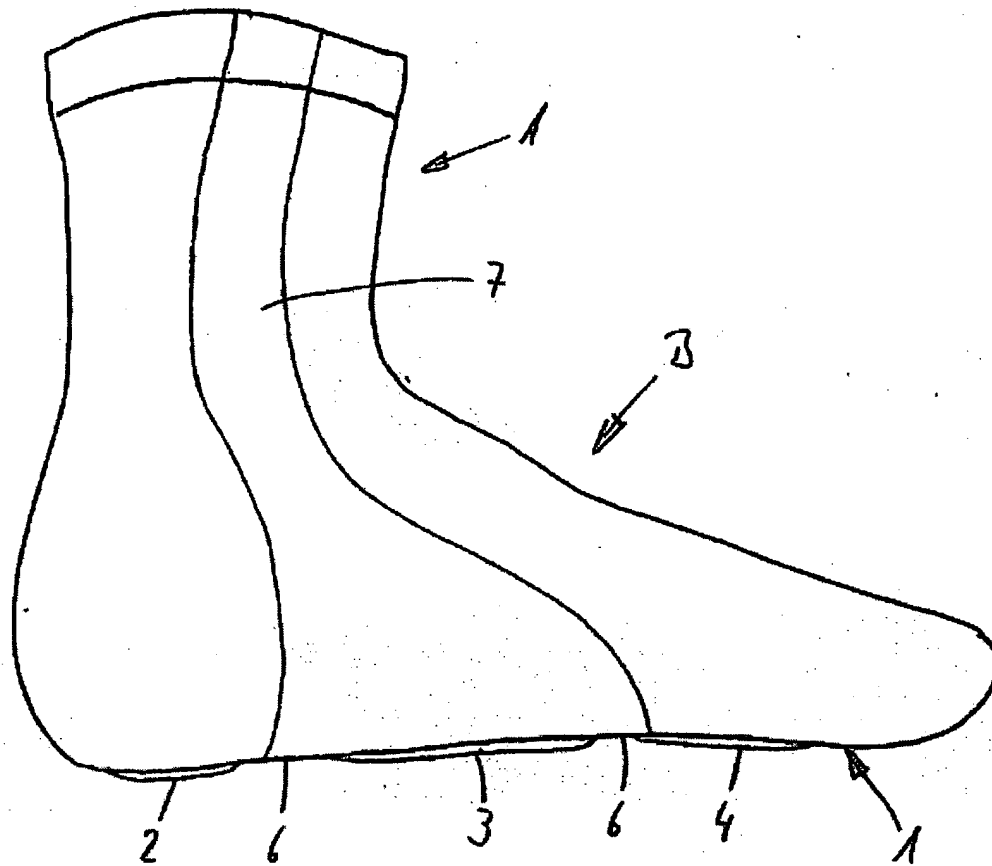


Figure 2

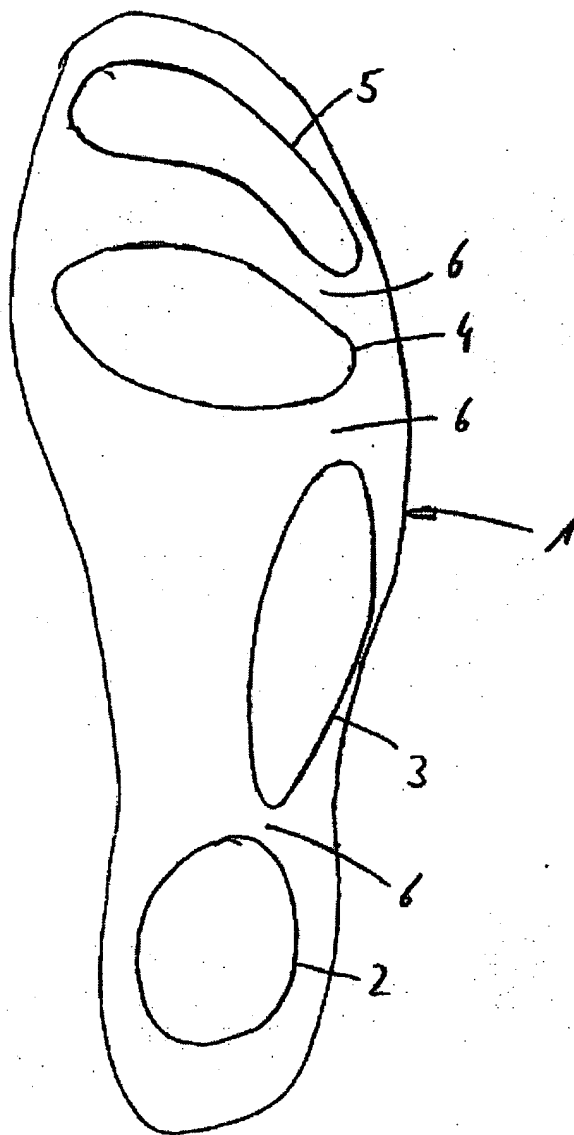


Figure 3

